Practice

Happy is recessive to sad

	# happy	Total	p^2	$2pq$	q^2	p	q
a	5	10	.08	.41	.5	.29	.71
b	7	20					
c	12	30					

a

$q^2 = \frac{\#rec}{\#total} = \frac{10}{20} =$

$q^2 = .5$

$\sqrt{q^2} = \sqrt{.5}$

$q = .71$

$p + q = 1$

$p + .71 = 1$

$p = .29$

$p^2 = (.29)^2$

$p^2 = .08$

$2pq$

$2(.71)(.29) = .41$

$p^2 + 2pq + q^2 = 1$

$.08 + .41 + .5 = .99$

b

c

$p + q = 1$

$.29 + .71 = 1$

Hardy-Weinberg Equilibrium

$p^2 + 2pq + q^2 = 1$ $\quad p + q = 1$

Always find q^2 (aa) first ⇒ Always know recessive phenotype is aa or q^2

Of 100, 96 passed and 4 failed
failing is recessive

a) Frequency of recessive allele (q)

$$q^2 = \frac{\#\text{recessive alleles}}{\text{total alleles}} = \frac{8}{200} = .04$$

$$q = \sqrt{q^2} = \sqrt{.04}$$

$$q = .2$$

b) Frequency of dominant allele (p)

$$p + q = 1$$
$$p + .2 = 1$$
$$-.2 \quad -.2$$
$$p = .8$$

c) Frequency of heterozygous genotype

$$2pq = 2(.8)(.2) = .32$$

) Cystic Fibrosis is recessive, 1 in 2,500 babbies are aff

$$q^2 = \frac{2}{5,000} = .0004$$

$$q = \sqrt{q^2} = \sqrt{.0004} = .02$$

$$p + q = 1$$
$$p + .02 = 1$$
$$p = .98$$

$p^2 = (.98)^2$
$= .96$

$2pq = 2(.98)(.02)$
$= .04$

Hardy-Weinberg Equil...

Name _____ Period _____ Date _____

SECTION 11.4 | HARDY-WEINBERG EQUILIBRIUM

Power Notes

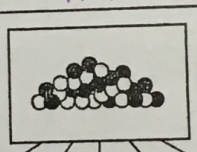
Hardy-Weinberg equilibrium: allele frequency in a population stay the same from 1 generation to the next
Why is it important: Shows factors that lead to evolution

Five Conditions Required to be in Equilibrium ∴ Not Evolving

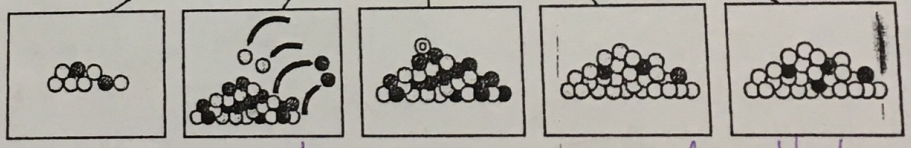
1. Large Population
2. No mutations
3. Random mating
4. No Natural Selection
5. No Migration (Immagration / Emigration) (No Geneflow)

Hardy-Weinberg equation: $p^2 + 2pq + q^2 = 1$
What it means: Genotypic frequency: AA (homo dom) Aa (hetero) aa (homo Recessive)
How it is used:

Allele frequency:
$p + q = 1$
A a


Initial Population

Five Factors that Can Lead to Evolution



1. Genetic Drift → F, BN
2. Migration → Geneflow → Em, Imm
3. Mutations
4. Sexual Selection
5. Natural Selection

Evolving

Generations	P	Q
1	.8	.2
2	.75	.25
3	.6	.4

Equilibrium (Not Evolving)

P	Q
.8	.2
.8	.2
.8	.2